

- (21) Application No: 7833253
(22) Date of filing:
14 AUG 1978
(23) Claims filed:
14 AUG 1978
(30) Priority data:
(31) 7725031
(32) 16 AUG 1977
(33) FRANCE (FR)
(43) Application published:
28 FEB 1979
(51) INT. CL.²: B29C 17/02
(52) Domestic classification:
B5A 1R214A 1R314C1B
1R314C1C 1R429X
20T10 B17
F2P 1A10 1B7
(56) Documents cited:
GB 699164
GB 606735
(58) Field of search:
B5A
(71) Applicants:
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(54) A CATHETER TUBE AND
METHOD OF MAKING SAME

(57) A catheter tube comprises one end (7) which is turned back to cover and trap a ring (5) fitted around the exterior of the tube. Such a tube can be made by forming an annular cup-shaped space by means of a mould and mandrel (2), sliding said one end of a

tube down the mandrel and positioning a ring around the exterior of the tube. By softening the tube using heat and sliding the tube down the mandrel, the end of the tube is constrained to turn back and cover the ring. Pushing of the ring further within the turned back end of the tube causes crushing of the ring and the trapping of same by the turned back end of the tube.

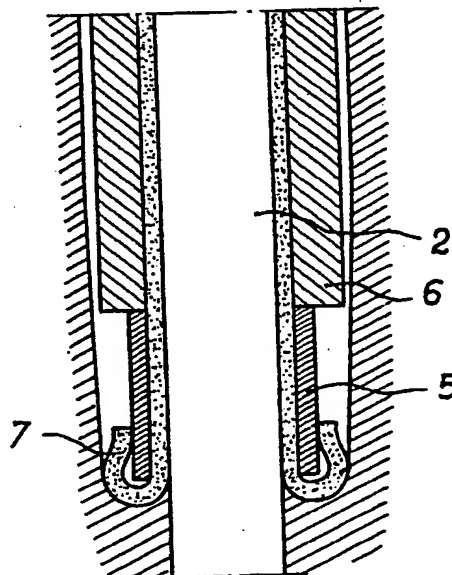


FIG. 3

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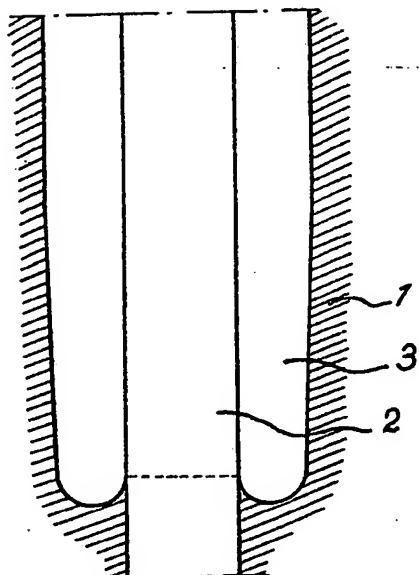


FIG. 1

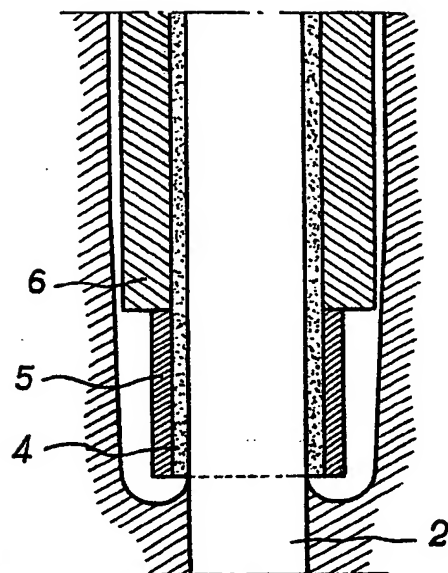


FIG. 2

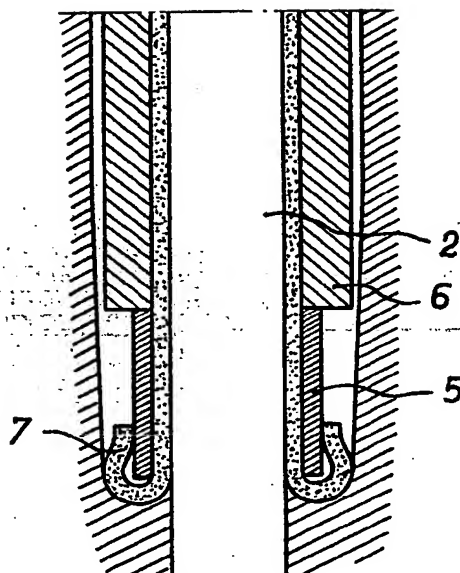


FIG. 3

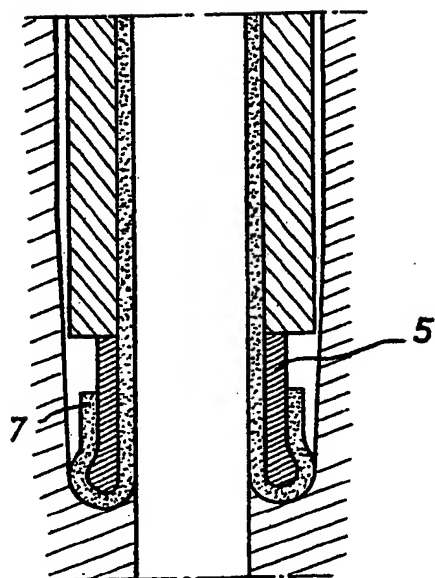


FIG. 4

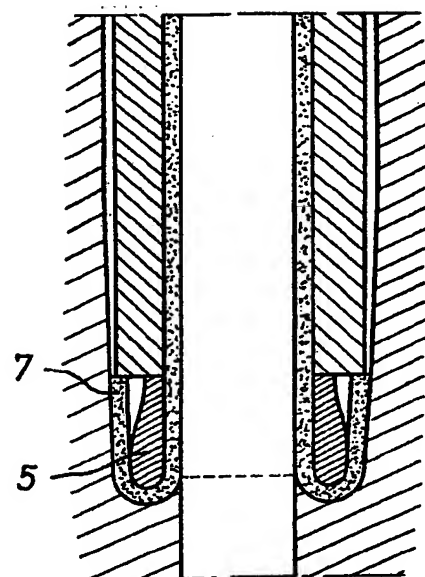


FIG. 5

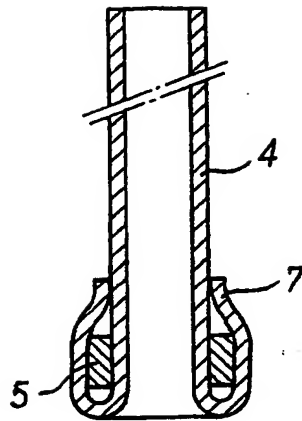


FIG. 6

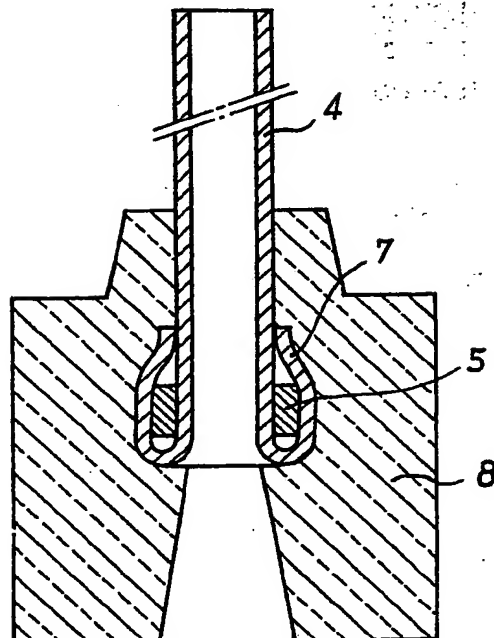


FIG. 7

SPECIFICATION.

A CATHETER TUBE AND METHOD OF MAKING SAME

The present invention relates to a catheter tube and a method of making same.

Catheters for use intravenously or intraarterially generally comprise a tube of plastics material and a proximal part intended to supply the catheter with blood or a other body fluid. This proximal part is frequently referred to as the "base". Its attachment to the catheter tube should be firm and fluid-tight.

The present invention relates in particular to catheter tubes made of polytetrafluoroethylene or other similar material having the same sliding properties for use with a base made of a different plastics material.

The choice of polytetrafluoroethylene as the material for the catheter tube is frequently preferred owing to the ease with which a tube of this type slides when it is introduced through the skin and the wall of a blood vessel.

Generally, various methods are used for connecting a base to a catheter tube. The best known methods involve the use of an adhesive to stick the base to the tube, possibly after chemical treatment, and the moulding of the base onto the tube, which is carried out mainly when the plastics material of the catheter tube is able to fuse with the material of the base.

Hitherto, the method of moulding the base onto the tube has not been used with polytetrafluoroethylene tubes, owing to the poor results obtained, as a result mainly of the sliding qualities of the polytetrafluoroethylene tube.

The object of the present invention is to obviate or substantially mitigate this drawback and provides a catheter tube which facilitates the application of the moulding method to the tube when made of polytetrafluoroethylene or other material having similar sliding properties.

According to a first aspect of the present invention, there is provided a catheter tube, one end of which is turned back to cover and thereby trap a ring fitted around the exterior of the tube.

With such a catheter tube the subsequent moulding of a base onto said one end of the tube leads to a satisfactory and economical attachment and solidarity of the tube and base.

The base is preferably made of a plastics material, which has a high coefficient of shrinkage, in particular polyethylene or polypropylene.

According to a second aspect of the present invention there is provided a method of making a catheter tube according to the abovementioned first aspect and comprising the steps of forming an annular cup-shaped space by means of a mould and a mandrel, fitting one end of a tube on the mandrel, positioning a ring around the exterior of the tube, heating the tube to soften same, sliding the tube down the mandrel in order to constrain the end thereof to turn back and cover the ring, and pushing the ring down further within said

turned back end of the tube in order to crush the ring and thereby trap same in the turned back end.

An example of the present invention will now be described with reference to the accompanying drawings, in which:—

Figures 1 to 5 show the successive stages of a method for the production of a catheter tube according to the invention;

Figure 6 is a sectional view of a catheter tube according to the invention; and

Figure 7 is a sectional view of a catheter tube as shown in Figure 6 with base moulded thereto.

Figure 1 shows an annular aperture 3 defined by a cup-shaped space between a mould 1 and a sliding metal mandrel 2. A polytetrafluoroethylene tube 4, for example made of Teflon (a Registered Trade Mark of Dupont Inc.), is introduced onto the mandrel 2 and a rigid ring 5 of metal or hard plastics material, such as polyethylene, is slid over the tube 4 and is pushed into place by a steel cylinder or pusher 6 (figure 2). The tube 4 is then moved further down the mandrel 2 by sliding and is thus constrained to turn back in the bottom of the aperture 3 as at 7 (figure 3). To facilitate this operation, the mandrel 2 and tube 4 assembly is heated to a temperature of approximately 330°C, which is the transition temperature of polytetrafluoroethylene.

Subsequently, the pusher 6 is depressed in order to crush the polyethylene ring 5 in the bottom of the aperture 3 (figures 4 and 5); the temperature is still being approximately 330°C.

The mould 1, the pusher 6 and mandrel 2 are then removed. This leaves the tube 4 with its turned back end 7 and the ring 5, and thus comprises a catheter tube. This partly finished product can then be introduced into a conventional mould and a conventional Luer-Lock base of polypropylene or polyethylene can be moulded onto the proximal end as if it were a simple cannula.

Without a catheter tube manufactured according to the present invention, one such tube made of polytetrafluoroethylene would not remain secure in the moulded polypropylene base. A pulling force of several grammes would be sufficient to separate the latter and one would observe leakages of liquid at the junction of the two materials.

In the embodiment shown in figure 6, the ring 5 has not been crushed, but is simply trapped by the turned-back end 7 of the tube 4.

Figure 7 shows the tube of figure 6 and a base 8 subsequently moulded on the latter.

CLAIMS

1. Catheter tube, one end of which is turned back to cover and thereby trap a ring fitted around the exterior of the tube.

2. A tube as claimed in Claim 1, in which the tube is made of polytetrafluoroethylene or other material having similar sliding properties.

3. A method of making a catheter tube as claimed in Claim 1, comprising the steps of forming an annular cup-shaped space by means of

- a mould and a mandrel, fitting one end of a tube on the mandrel, positioning a ring around the exterior of the tube, heating the tube to soften same, sliding the tube down the mandrel in order to constrain the end thereof to turn back and cover the ring, and pushing the ring down further within said turned back end of the tube in order to crush the ring and thereby trap same in the turned back end.
4. A method as claimed in claim 3, in which the tube is made of polytetrafluoroethylene or other material having similar sliding properties and

further comprises the step of moulding said one end of the tube to a base made of a different material.

- 15 5. A catheter tube substantially as hereinbefore described with reference to Fig. 6 or 7 of the accompanying drawings.
6. A method of making a catheter tube substantially as hereinbefore described with reference to any of Figs. 1 to 7 of the accompanying drawings.
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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1979.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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